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CHAPTER 26

BREATHING APPARATUS

2601. Categories of Breathing Apparatus

There are 2 categories of breathing apparatus used in Royal Navy surface vessels and Royal Fleet Auxiliaries for firefighting purposes and for use in emergency escape situations as described below:

- a. **Breathing Apparatus (Damage Control).** This is the generic term used to describe the breathing apparatus (BA) used by damage repair parties and firefighters. Extended Duration Breathing Apparatus (EDBA) is the current BA (Damage Control).
- b. **Emergency Escape Breathing Device (EEBD).** It provides respiratory protection for personnel escaping from a toxic or smoke filled atmosphere. It is not suitable for firefighting, rescue or repair work.

SECTION 1 - EXTENDED DURATION BREATHING APPARATUS**2602. Introduction**

Extended Duration Breathing Apparatus (EDBA) has a low magnetic signature and is suitable for use in all RN ships (including Hunt and Sandown Class), submarines and RFAs. Full details are contained in BR 8223(1).

2603. Description

EDBA is a positive pressure, first-breath activated, lightweight, low maintenance set, fitted with a 9 ltr air cylinder (free air capacity 2430 ltrs) capable of being charged to 300 bar. The set comprises a one-size facemask with a net head harness (see [Fig 26-2](#)), an ergonomically designed backplate with a comfortable flame retardant harness (see [Fig 26-3](#)), a lightweight composite air cylinder, a high pressure reducing valve, a warning whistle and a pressure gauge. The facemask assembly is fitted with an oro-nasal mask, an exhalation valve incorporating a speech diaphragm, and an automatic first-breath operated positive pressure demand valve. The demand valve is designed to be re-set by pressing the black rubber re-set button (on the demand valve). This closes off air to the facemask, enabling it to be removed. The demand valve is also fitted with a manually operated by-pass valve, which allows a free flow of air into the facemask, in case the wearer gets into difficulty. A bulb horn distress alarm is to be attached to the left shoulder strap of the EDBA set.

2604. Stowage

EDBA is stowed in lockers, ready for immediate use, with all straps fully extended. A tally, detailing the functional and face seal checks, is attached inside the locker door. Control boards are stowed in selected lockers, which are identified by a 50 mm wide white band on the front and sides, 50 mm from the base of the locker. The distribution of control boards is to be detailed in ships CBRNDC Orders. The 'set number' tally is attached to the D ring on the left shoulder strap of a stowed EDBA.

2605. Duration

To maximise duration, EDBA should be charged to the highest pressure available from the HP air system, up to a maximum of 300 bar. However, most ships do not have a HP air system that is capable of achieving this pressure and are therefore to charge EDBA to the maximum working pressure of their system up to the maximum of 300 bar. To allow a tolerance for EDBA checks, cylinder pressures in stowed sets may be allowed to fall to 10 bar below the full charge, eg if the HP air ringmain delivers 270 bar, stowed EDBA sets are to be charged to 270 bar but may be allowed to fall to 260 bar before recharging. When EDBA checks are carried out the ship is to ensure that the HP air ringmain is at maximum pressure. The duration varies with air pressure, as follows:

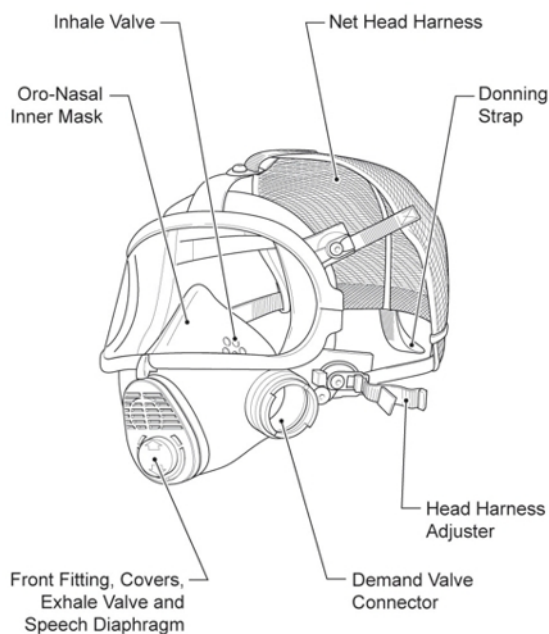
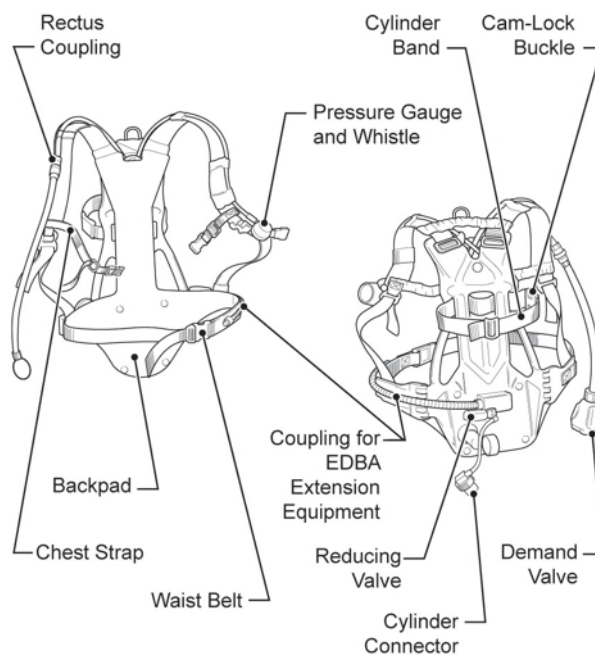
- a. **300 bar:** 48 min working duration + 12 min whistle = 60 min.
- b. **240 bar:** 39 min working duration + 12 min whistle = 51 min.
- c. **207 bar:** 33 min working duration + 12 min whistle = 45 min.
- d. **200 bar:** 32 min working duration + 12 min whistle = 44 min.
- e. **160 bar:** 24 min working duration + 12 min whistle = 36 min.

**Notes:**

1. *The warning period will be 12 min only if the whistle is correctly set at 55 bar, and will depend on the individual wearer and the task being carried out.*
2. *These times exceed the work periods for action coveralls or No 4s and PBI Gold in [Table 25-2](#), so heat stress will normally limit operations before BA endurance.*

Fig 26-1. Extended Duration Breathing Apparatus (EDBA)



Fig 26-2. Facemask Assembly**Fig 26-3. Back Plate and Harness****2606. Donning and Functional Checks**

- a. While stowed in its locker, the EDBA must be maintained in a state of readiness for immediate use, with the air cylinder fully charged to the correct working pressure (within 10 bar of ships declared ringmain pressure). Approval must be obtained from the officer in charge of firefighting (DCO or OOD), prior to using a set if the pressure is below the minimum approved operating pressure of 160 bar.

- b. With assistance from the BA Controller, the wearer dons the set as follows:
- (1) Remove the facemask from the stowage clip. Place the facemask neck strap over the head and allow the facemask to hang on the chest. The neck strap must be worn under the firefighters hood.
 - (2) Release the bands securing the set in its locker, and pass the right arm through the right shoulder strap. Lift the set clear of the locker and pass the left arm through the left shoulder strap.
 - (3) Adjust the shoulder straps by pulling them down and towards the rear. Fasten the waist belt and chest strap, taking care not to overtighten.
 - (4) Check that the bypass valve is in the closed position and the demand valve (DV) reset button is pressed.
 - (5) Open the cylinder valve fully and check that the warning whistle sounds briefly (in the 0-55 bar range). If the whistle is not heard to operate when the cylinder valve is opened:
 - (a) Shut the cylinder valve. Open the bypass valve to reduce pressure to 55 bar, at which point the whistle should sound.
 - (b) Close the bypass valve. If the whistle still does not operate, it is defective and the set must not be used. The BA Coordinator must be informed.
 - (6) On completion of the test, open the cylinder valve fully.

2607. Face Seal Check

When the wearer is required to commence a task, the following routine is to be carried out:

- a. Place the chin in the chin cup, pull the head harness back over the head and tighten the head harness straps.
- b. Inhale sharply to activate the DV first-breath mechanism and then breathe normally.
- c. Twist the DV gently to confirm that the locking catch is fully engaged.
- d. Open the DV bypass valve and check that there is a free flow of air into the mask. Set the bypass valve to the closed position.
- e. Shut the cylinder valve and then quickly open it one quarter of a turn. Take a deep breath. Shut the cylinder valve and check that there is no sound of escaping air, and that the pressure gauge reading does not fall by more than 10 bar (one division on the dial) in 10 secs.
- f. Open the cylinder valve fully, breathe normally and check that the gauge reading is steady. If it is not, check that the cylinder valve is fully open. If the gauge fluctuates when the cylinder valve is fully open, do not use the set.

- g. Test the distress alarm.
- h. On completion of a successful face seal check the BA controller removes and retains the 'set number' tally, enters the wearers name and cylinder pressure on the control board.
- i. Pull up the firefighters hood, check protective clothing and proceed on task.

**Notes:**

1. *If the wearer is not required immediately, take a deep breath and press the black rubber reset button on the DV to close off air to the facemask. Remove the facemask and allow it to hang on the chest.*
2. *The face seal check must be performed each time a wearer dons the facemask for operational purposes.*
3. *On completion of the face seal check, the BA Controller must enter, on the control board, the time at which the wearer starts to breathe from the set*

2608. Extension Equipment

Extension equipment for EDBA (see [Fig 26-1](#)) comprises a rescue mask (RM) assembly with head harness, a 2 m extension hose and a 15 m extension hose. These items are stowed in a red locker, which has a drop-down door. A tally on the inside of the door gives the operating instructions for EDBA extension equipment. Two 15 m extension hoses can be connected together to give a maximum length of 30 m. The 2 m hose is not to be added to this 30 m length. Instructions in the use of EDBA extension equipment is as follows:

- a. Remove equipment and check condition of hoses and couplings.
- b. Connect 2 m/15 m hose and mask ensuring connections are fitted correctly and tight.
- c. Obtain EDBA and carry out full wearer checks.
- d. Check the extension mask by-pass valve is closed; connect extension hose to EDBA and lock.
- e. Carry out face seal check on extension mask.
- f. Once 'on air' place full details on the EDBA control board. A nominated person is to control both the set and board.

**Notes:**

1. *On each occasion the extension facemask is worn a full face seal check must be carried out.*
2. *For instructions for the use of EDBA extension equipment in the SAR role see [Annex 21H](#).*

2609. BA Control

When EDBA sets are used operationally, a BA Controller must be detailed. The duties of a BA Controller are detailed in [Chapter 20](#).

2610. Completion of the Control Board

The BA Controller is to carry out the following entry instructions after the firefighting team has been briefed and tasked by the Officer/Rating I/C of firefighting:

- a. Confirm a face seal check (see [Para 2607](#)).
- b. Remove the 'set number' tally from the BA and clip it onto the Control Board (see [Fig 26-4](#)).
- c. Check that the wearers dress is correct.
- d. Check the wearers personal distress device is functional.
- e. Before the wearer enters, complete his details in columns A, B and C. The abbreviations to be used in the task column are **FF** for all members of firefighting teams, **BC** for boundary coolers, **SAR** for search and rescue teams and **DC** for any other use.
- f. Turn the dial to set the cylinder pressure (B) window over the minute of start time (from column C).
- g. Read off and enter times in columns D, E and F.
- h. Repeat for each BA wearer. Stay at the entry point.



Note. When acting as BA Controller for the Attack BA, the Controller is to obtain a BA control board and enter on it the time of the fire alarm as the 'time started to breathe'. The BA Controller may not see the Attack BA Team prior to their entry and must assume that their initial BA pressure, as entered on the control board, is 160 bar (for EDBA).

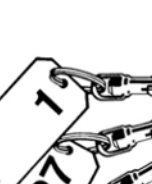
2611. MM/PP 2 Person Attack BA Control Board for EDBA

For details of the use of the 2 Person Attack BA Control Board for EDBA see [Para 3728](#).

2612. BA Tote Board

The BA Coordinators Tote Board is illustrated at [Fig 26-5](#). It is used by the BA Coordinator to keep a running record of the location and state of all BA sets and spare air cylinders available for Damage Control.

Fig 26-4. EDBA Control Board



E.D.B.A. Control Board

SET No.	OPERATOR'S NAME	TASK	B		C	D	E	F
			CHARGE PRESSURE	TIME STARTED TO BLEND	TIME RELIEF COOL IN	TIME RETURN COMMENCES	TIME DUE OUT	
	KEATING	FF	300	1157	1238	1245	1257	
	ADAMS	FF	240	1205	1237	1244	1256	
	HOB DAY	FF	270	1209	1245	1252	1304	
	SMALLEY	FF	280	1217	1256	1303	1315	

If operator does not emerge by time due out inform officer in charge.

ENTRY INSTRUCTIONS

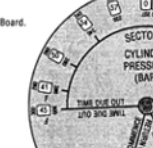
- Remove set No. tally from B.A. and clip onto Control Board.
- Before operator enters complete A.B.C.
Check dress is correct.
Confirm face seal check.
Check personal distress device.

CONTROLLER'S INSTRUCTIONS

- Set cylinder pressure B window over minute of start time column C.
- Read off and enter D.E.F.
- Repeat for each operator. Stay at entry point.

EXIT INSTRUCTIONS

- Remove set No. Tally and replace on BA set.
- Operator to be debriefed by person in charge of fire fighting then report to B.A. co-ordinator.



NOTE:

- Endurance times are approximate, actual duration will depend on individual tasks.
- Permission of officer in charge is required to use set if charge is below 160 bar.

At 55 bar the whistle blows and 12 minutes breathing time remains.

NSN

2613. EDBA - Periodicity of Checks and Controls

In order to maximise EDBA reliability and reduce unnecessary work EDBA checks are to be carried out weekly when the following routine has been adopted and briefed:

a. **Blue Routine.** Weekly and after each occasion of use EDDBA sponsors/nominated personnel are to conduct EDDBA checks paying particular attention to ensuring that the set is fully charged (ie 300 bar maximum or within 10 bar of the ships declared ringmain pressure). Most units already manage EDDBA and other safety equipment checks by planning an 'EDDBA Day' or a 'Safety Day' - this approach facilitates QA as well as acknowledging the importance of these checks and this approach is strongly recommended. On completion of satisfactory checks a tamper proof tag is to be fitted to the securing arrangement on each EDDBA locker door in such a way that the door cannot be opened without breaking the tag. The date checked and the cylinder pressure is to be annotated on the door and the EDDBA log signed. The date checked is also to be annotated on the tamper proof tag in permanent ink. The 'sealed' EDDBA contained within will normally require no further checks for 1 week providing the tamper proof tag remains intact. If ships staff discovers a locker with a damaged or missing tag, HQ1 is to be informed and action is to be taken to re-check the BA set before a replacement tag is fitted. RFAs already implementing a weekly routine, with the exception of fitting a tag, are to revise onboard routines and comply with these changes. Under certain circumstances, there may be a requirement to reduce the periodicity of the EDDBA checks eg the EDDBA sets dedicated for flight deck use. As part of Standard Operating Procedures prior to flying stations the EDDBA locker tamper proof tag is to be checked intact and the date of test/cylinder pressure is to be checked in-date and correct iaw BRd 766 - Embarked Aviation Operating Handbook.

- b. **EDBA Log.** [Annex 26A](#) details the EDBA log sheet to be locally reproduced and adopted uniformly across the Fleet. Planning routine exercises in different areas of the ship will clearly reduce the requirement to use more than one set of forms per week.
- c. **Training.** Tamper proof tags are designed for single use only and are designed to break easily on opening EDBA locked doors. These tags can be obtained from Naval Stores via BRd 2170(3) and are the only tags to be used as stronger seals or cable ties could damage the lockers.
- d. **Maintenance.** The cylinder is to be cool before stowage and all locker contents accounted for. Environmental factors affect the cylinder pressure and to allow for this a 10 bar drop in cylinder pressure is permissible over the period of a week. A pressure drop in excess of this will require investigation by the maintainer.

Fig 26-5. BA Coordinators Tote Board (not to size)

BA Co-ordinators Tote Board										
Breathing Apparatus						Cylinders				
IDENT NO	Stowage Location	Serviceable	Defective	In Use	At BA Dump	IDENT NO	Stowage Location	Charged	Empty	At BA Dump
1						1				
2						2				
3						3				
4						4				
5						5				
6						6				
7						7				
8						8				
9						9				
10						10				
11						11				
12						12				
13						13				
14						14				
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24						24				
25						25				
26						26				
27						27				
28						28				
29						29				
30						30				
31						31				
32						32				
33						33				
34						34				
35						35				
36						36				
Total From Ship						Total From Ship				
Total From Other Sources						Total From Other Sources				
Total						Total				

* Re-entry BA - Not To Be Removed To BA Dump

BA Controller	Task Of Team

BA Charging Points		
Location	Available	Operator Name
1		
2		
3		
4		
5		
6		

SECTION 2 - EMERGENCY ESCAPE BREATHING DEVICE

2614. Purpose and Function

The Emergency Escape Breathing Device (EEBD) is a one-shot, short duration re-breathing set that provides respiratory protection for personnel escaping from a toxic or smoke-filled atmosphere. It is not suitable for heavy use (such as firefighting, rescue or repair work). EEBD is automatically activated when it is withdrawn from the base of its container and has a minimum working duration of 10 mins (at a hard working rate) from the time of activation. It is normally stowed in racks located in compartments containing personnel, but it can also be worn on a belt. The unit fits into existing stowages however modification of the securing strap is required. Bespoke EEBD stowages will be fitted into new build ships and submarines. EEBD is approved for use within magazines provided that there is no more than 1 unit per 1 m³ compartment volume. Should a person wearing respiratory protection that does not support life in an oxygen deficient environment, ie General Service Respirator (GSR), encounter a toxic or smoke filled environment they should immediately remove that device and don EEBD.

Fig 26-6. Emergency Escape Breathing Device (EEBD)



2615. Description

The EEBD is fully described in BR 9322. The device, illustrated at [Fig 26-6](#), is stowed in an orange coloured plastic case and comprises of:

- a. A mouthpiece.
- b. A nose clip, permanently attached to the mouthpiece.
- c. A neck strap.
- d. An oxygen cylinder, gauge and regulator.
- e. A scrubber to remove carbon dioxide from exhaled air.
- f. A breathing bag, which receives oxygen from the regulator and exhaled air from the user.
- g. A face shield to provide head and eye protection from smoke. This is not part of the breathing circuit.
- h. A plastic cover and base which encapsulate the device until it is used.

2616. Operating Instructions

To use an EEBD, proceed as follows:

- a. Remove EEBD from the orange stowage case.
- b. Lift the yellow lever and discard the cover.
- c. Remove the unit from the base by pulling the yellow neck strap upwards.
- d. Insert the yellow mouthpiece, so that the flange seals between the lips and gums. Gently bite on the mouthpiece.
- e. Inhale through the mouth.
- f. Fit the yellow nose clip.
- g. Adjust the yellow neck strap, if necessary, by pulling upwards on the O-ring.
- h. Don the face shield and pull outwards on the O-rings to tighten it around the neck.
- i. Escape.
- j. If vision is impaired by condensation, rub the inside of the face shield against the face to clear it.

2617. EEBD In-Service Life

EEBD has a 15 year in-service life from the date of manufacture when retained within the storage case. A 5 year limit is imposed when EEBD is belt worn or stowed outside the storage case. After 5 years the unit must be returned to its storage case for the remaining 10 years of life. Each EEBD and its stowage are to be given a local number for identification purposes and tracking of belt worn units (3M self-adhesive labels are ideal). For ease of maintenance and control, wearing an EEBD in the belt mode for a day does not need to be recorded against the 5 year period. Only when a unit is worn for a continuous period in excess of 30 days is it to be recorded as part of the 5 year limit. When belt worn the EEBD is subject to user checks and must be regularly checked. Daily user checks are described at [Para 2619](#). A more comprehensive description is contained within BR 9322.

2618. EEBD - Operations Room Use

The routines currently used within the operations room at States 1 or 2 are to be adapted for EEBD. If insufficient stowage racks exist within the operations room nominated sets are to be removed from adjacent flats, attached to a belt and placed at the operators chair as dictated by the readiness state.

2619. Maintenance

EEBD is a one-shot device that requires no maintenance other than a regular visual check. The inspections described below are to be carried out before use or at the beginning of each watch if belt worn. If stored, the following visual inspection should be carried out annually:

- a. Check the presence of the tamper proof ball.
- b. The gauge needle should be in the green zone. If it is in the red zone or on the white zero pressure mark, the unit is not to be used. Should the view of the gauge be obscured the unit is to be withdrawn from service.
- c. Visually inspect for indications of high force impacts checking for:
 - (1) Cracks, burns, or deformation of case.
 - (2) Excessive gaps between the cover and base.
 - (3) Damage to the latch or cover band.
 - (4) Dirt, debris or moisture visible through the gauge window.
 - (5) Damaged or broken belt loops.
- d. Check that the unit has not exceeded the life date.

**CAUTION**

Should the EEBD fail any of the above inspections the unit should be removed immediately from service. The replacement procedure is detailed in BR 9322.

2620. Training Model

To avoid expensive use of operational EEBDs during training, a special reusable training model is provided in a distinctive blue case. It has the same dimensions as the operational EEBD but contains dummy oxygen and scrubber system components. The mouthpiece simulates breathing resistance and should be disinfected after each use. All ships staff are required to don a training model at 6 monthly intervals as a minimum qualification period. Successful completion of EEBD training is to be recorded by the WSQ in the CBRNDC Training and Material Assessment Log. CBRNDCQs are to incorporate EEBD training into damage control circuit training and Harbour Fire and Emergency Party (HFEP) briefs. Live units are used during BSSC, CBRNDC 35 and OST and their use is to be recorded as counting towards an individual's training requirement. To facilitate onboard EEBD training a lecture plan is provided at [Annex 36D](#), an example of the recording of onboard training see [Table 26-1](#) and a blank Training Record Form provided at [Table 26-2](#).

Table 26-1. Example EEBD Training Record Form

NAME	SERVICE NUMBER	RANK/RATE	LAST TRAINED	LIVE/TRAINER	TRAINING METHOD (SHIP/FOST)
BLOGGS	D128371D	ET(ME)	06/01/09	TRAINER	SHIP
JONES	D123123T	LET(ME)	13/01/09	LIVE	FOST

Table 26-2. EEBD Training Record Form

[illegible]